

AMENDMENTS TO THE CLAIMS

The text of all pending claims, (including withdrawn claims) is set forth below. Cancelled and not entered claims are indicated with claim number and status only. The claims as listed below show added text with underlining and deleted text with ~~striketrough~~. The status of each claim is indicated with one of (original), (currently amended), (cancelled), (withdrawn), (new), (previously presented), or (not entered).

The following listing of claims replaces all prior versions and listings of claims in the application:

Listing of Claims:

1. (currently amended) An assay chip (2) ~~for investigation of the a~~ functionality of non-lipid molecules and their interactions with molecules, comprising:
 - a) a nanopore substrate (28) having a plurality of nanopores (8);
 - b) a ~~suitable~~ substantially planar support layer (6) deposited on said nanopore substrate (28) and having a plurality of nanopores (8) ~~corresponding with~~ to said nanopores of said nanopore substrate (28);
 - c) a biologically effective layer (4) ~~being capable configured~~ to host at least one of a non-lipid molecule ~~or and~~ functional molecule, deposited on said support layer (6) and covering the plurality of nanopores (8), resulting in accessible nanopores (8) ~~from both sides of the biologically effective layer (4) for~~ measurements.

2. (currently amended) The assay chip (2) according to claim 1, ~~characterized in that wherein the a~~ surface of the support layer (6) is chemically modified by at least one of such as activated hydrophobic ~~or and~~ hydrophilic silanes ~~or other components~~ resulting in a support promotion layer (9).

3. (currently amended) The assay chip (2) according to claim 1 ~~or 2~~, ~~characterized in that, wherein the suitable~~ support layer (6) is selected from ~~a the~~ group ~~containing consisting of~~ silicon nitride (Si₃N₄) and silicon oxide substrate (SiO₂), and

wherein the substrate (28) is selected from ~~a~~ the group ~~containing~~ consisting of silicon and carbon containing materials, polymers, metals, dielectrics, glass ~~or~~ and ceramics.

4. (currently amended) The assay chip according to ~~any one of the preceding~~ claim 1, ~~characterized in that~~ wherein ~~a~~ the thickness of the substrate and ~~the~~ a diameter of the nanopores (8) is chosen in order to ~~result with~~ have an aspect ratio in the range of 0.25 to 5, ~~preferably in the range of 0.75 to 2.~~

5. (currently amended) The assay chip according to claim 4, ~~characterized in that~~ wherein the diameter of the nanopores (8) is in the range of 50 to 2000 nm, ~~preferably 100 to 2000 nm.~~

6. (currently amended) The assay chip according to ~~any one of the preceding~~ claim 1, ~~characterized in that~~ wherein said nanopores are arranged in a plurality of nanopore array sections (7) having an area in the range of $1 \times 10^{-6} \text{ mm}^2$ to 1 mm^2 on ~~the~~ a total free standing silicon nitride membrane area (29) of $1 \times 10^{-6} \text{ mm}^2$ to 10 mm^2 .

7. (currently amended) The assay chip according to ~~any one of the preceding~~ claim 1, ~~characterized in that~~ wherein said nanopores (8) ~~having~~ have a distance from each other in the range of 0.5 to 5-times of their diameter, ~~preferably in the range of 0.8 to 2-times of their diameter.~~

8. (currently amended) The assay chip according to ~~any one of the preceding~~ claim 1, ~~characterized in that~~ wherein the biologically effective layer is a biomembrane isolated ~~preferably from one of prokaryotic or and eukaryotic cells, and~~ wherein a or the lipid bilayer is formed by preparation and later fusion of lipid vesicles or is a functional layer of supramolecular assembly.

9. (currently amended) The assay chip according to ~~any of the preceding~~ claim 1, ~~characterized in that~~ wherein the non-lipid molecules are from a natural source selected from the group consisting of like cells of eukaryotes or and prokaryotes.

10. (currently amended) The assay chip according to claim 9~~1~~, ~~characterized in that wherein~~ the biologically effective layer hosts a non-lipid molecule, and wherein the non-lipid molecule is a synthetic compound.

11. (currently amended) The assay chip according to claim 8, ~~characterized in that wherein both the~~ biomembranes and the lipid bilayers each comprise at least one of a non-lipid and/or functional molecule (3), whereby the functional molecule (3) is produced using one of recombinant DNA or and RNA technologies.

12. (currently amended) The assay chip according to claim 8, ~~characterized in that wherein~~ the biologically effective layer is made from at least one intact living cell.

13. (currently amended) A process for analyzing ~~the a~~ functionality of at least one of a non-lipid molecule or and functional molecule (3), being integrated in a biologically effective layer (4) ~~of the an~~ assay chip comprising a nanopore substrate having a plurality of nanopores, a substantially planar support layer deposited on said nanopore substrate and having a plurality of nanopores corresponding to said nanopores of said nanopore substrate, and a biologically effective layer configured according to any one of the preceding claims 1 to 12, the process comprising:

a) applying a fluid containing a binding compound (14, 22) to one side of the ~~fluid~~ biologically effective layer in order to allow the binding compound (14, 22) to interact with the non-lipid molecule;

b) monitoring the response of the non-lipid molecule (3) induced by at least one of effector binding (14, 22) and/or the interacting an interaction of binding molecules (13) in the ~~fluid~~ biologically effective layer by measuring physical or chemical changes on ~~the cis- or trans-sides~~ of the assay chip (2).

14. (cancelled).

15. (cancelled).

16. (cancelled).

17. (new) The assay chip according to claim 4, wherein the diameter of the nanopores is chosen in order to result with an aspect ratio in the range of 0.75 to 2.

18. (new) The assay chip according to claim 5, wherein the diameter of the nanopores is in the range of 100 to 2000 nm.

19. (new) The assay chip according to claim 7, wherein said nanopores have a distance from each other in the range of 0.8 to 2-times of their diameter.